Amendments to the Specification:

Please replace the text beginning at the second last paragraph on page 13 to the end of the third paragraph on page 14 with the following amended paragraphs:

FIG. 1 represents an embodiment providing a broad aspect of the invention having a hydrogen production source 10, supplied by energy source 12 which may be an electricity generating power plant, or a natural gas, gasoline or methanol reforming plant or combinations thereof. Energy supplied by energy source 12 is generated from one or more types of primary energy resources P that may include renewable energy resources R. The types of primary energy resources P include fossil fuels, wind, solar, nuclear and hydro resources. A control unit 14 and users 16 are suitably linked by hardware input and output distribution conduits 18, 20, respectively, and electrical data transmission lines 22. Users 16 may include devices for converting stored hydrogen into electricity. Such devices may be connected to an electricity grid 2 such as a local area grid for residences, apartment complexes, commercial and industrial buildings or sites, or a wide area grid such as a national, state of provincial grid.

Users 16 define demands D for hydrogen transmitted by means of, for example (i) use of a credit card, (ii) use of a smart card, (iii) use of a voice activation system, (iv) manual activation via front panel control, (v) use of a electronic, electric, or wireless infrared data transmission system to register a hydrogen demand on the network. Upon receipt of the demand D, controller 14 determines the natures of the demand D with respect to the quantity of hydrogen requested, the time to deliver the hydrogen, the conditions under which to deliver the hydrogen with respect to the temperature, pressure, purity and the like and the rate of delivery of hydrogen requested. Such initial definition of the hydrogen demand D may be performed by a single controller 14 as illustrated in this embodiment or by a plurality of controllers 14 interconnected in a network, having a configuration in the form of, for example, a backbone (FIG. 1A), hub/star (FIG. 1B), or ring (FIG. 1C) in such a way as to permit intercommunication between all the users.

Upon receiving a demand, controller 14 determines the availability A of energy resources 12, to which it is interconnected, with respect to the amount of energy available, the nature of the

power available, the time availability of the energy, the type of energy source available, the unit prices per increment of energy and compares this to the energy required to generate the hydrogen demanded by users 16.

Upon receipt of the demand D, controller 14 further determines the status S of all hydrogen producing source(s) 10 on the network. The initial checks include the current status of the hydrogen source as a % use of rated capacity, rated capacity to produce hydrogen of a known quantity, and the amount of energy consumption. The initial checks further include monitoring of the process parameters for starting the hydrogen producing source and process valve and electrical switch status.

After controller 14 determines the initial status S of hydrogen producing source 10, the hydrogen demand D by users 16, and the nature and availability A of the energy sources 12 on the network, controller 14 then initiates the starting sequence for hydrogen producing source(s) 10 to meet the demands of users 16 subject to the availability of energy resource(s) 12 at the lowest possible cost. Controller 14 secures energy from source(s) 12 at a preferred cost to user 16 to permit hydrogen to flow through conduits 20. Energy is consumed by unit 10 in the generation of hydrogen which are supplied to users 16 along conduits 20.

Please replace the text beginning at the second paragraph on page 15 to the end of the third full paragraph on page 16 with the following amended paragraphs:

With reference now to FIG. 2, in an analogous manner as herein described with reference to the embodiment of FIG. 1, users 16 define a demand D for hydrogen, provided by a plurality of individual electrolysers 10 under the control of controller 14, from electrical energy source 2. Electrical energy supplied by electrical energy source 2 is generated from one or more types of primary energy resources P that may include renewable energy resources R. The types of primary energy resources P include fossil fuels, wind, solar, nuclear and hydro resources. Users 16 may include devices for converting stored hydrogen into electricity. Such devices may be

connected to electrical energy source 2 or any other electricity grid such as a local area grid for residences, apartment complexes, commercial and industrial buildings or sites, or a wide area grid such as a national, state of provincial grid.

FIG. 2 thus shows generally as 200, an energy network according to the invention having a plurality of hydrogen fuel generating electrolysers 10 connected to corresponding user facilities, above or below ground or vehicle storage 16. Electrical energy is provided to cells 10 by lead 18 on demand, individually or collectively from power grid source ~~22~~ 2 under the control of controller 14, and supplies hydrogen through conduits 20 to users 16. Control and supply controller 14 receives information from cells 10 and user facilities 16, as the fuel requirement and loading situation requires. Controller 14 further effects activation of the required electrical feed to cell 10 for hydrogen generation as required. The time of commencement, duration and electric power levels to a cell are also controlled by central controller 14. Information as to volume of hydrogen fuel container, hydrogen pressure therein and rate of pressure change on refurbishment are measured in real-time. Controller 14 further comprises data storage means 23 from which information may be taken and read or added. Iteration and algorithmic treatment of real time and stored data can be made and appropriate process control can be realized by acting on such data in real time.

With reference to FIG. 2 in more detail, user 16 defines a demand D for hydrogen and may transmit the demand by (i) use of a credit card, (ii) use of a smart card, (iii) use of a voice activation system, (iv) manual activation via front panel control, (v) use of an electronic, electric, or wireless infrared data transmission system to register a hydrogen demand on the network.

Upon receipt of the demand D, network controller 14 determines the nature of the demand D with respect to the quantity of hydrogen requested, the time to deliver the hydrogen, the conditions under which to deliver the hydrogen with respect to temperature, pressure, purity and the like, and the rate of delivery of hydrogen requested. Such initial definition of the hydrogen demand may be performed by a single controller 14 as illustrated in this embodiment or by a plurality of controllers 14 interconnected, for example, in a "hub/star", "backbone" or "ring" configuration in such a way as to permit intercommunication between all controllers 14.

Upon receipt of the demand D, controller 14 determines the availability A of electrical energy resources 2 to which it is interconnected with respect to the amount of energy available, the nature of the power available, in regard to current and voltage, the time availability of the energy, the type of electrical energy source available, the unit price per increment of electrical energy and compares this to the power required to generate the hydrogen demanded by users 16.

Controller 14 further determines the status S of all hydrogen producing electrolyser source(s) 10 on the network. The initial checks include the current status of the hydrogen source, % use of rated capacity, rated capacity to produce hydrogen of a known quantity, for a known amount of electrical consumption. The initial checks further include monitoring of the process parameters for starting electrolyser(s) 10, and in particular, the temperature, pressure, anolyte and catholyte liquid levels, electrical bus continuity, KOH concentration and process valve and electrical switch status.

After controller 14 determines the initial status S of electrolyser(s) 10, the hydrogen demand D by users 16 and the nature and availability A of the electrical sources on the network, controller 14 then initiates the starting sequence for electrolyser(s) 10 to meet the demands of users 16 subject to the availability of electrical energy resource(s) 2 at the lowest possible cost.

Please replace the second paragraph on page 17 with the following amended paragraph:

With reference to FIG. 3, this shows a system according to the invention shown generally as 300 having an electrolyser cell 10 which produces source hydrogen at a desired pressure P.sub.1 fed through conduit 24 to compressor 26. Compressor 24 feeds compressed outlet hydrogen through conduit 28 to user 16 at pressure P.sub.2, exemplified as a vehicle attached by a fitting 30. More specifically, user 16 may comprise a hydrogen conversion device such as an internal combustion engine for such a vehicle. Cell 10, compressor 26 and user 16 are linked to a controller 14.

Please replace the text beginning at the second last paragraph on page 19 to the end of the first partial paragraph on page 21 with the following amended paragraphs:

With reference now to FIG. 7 users 716 include a building unit 717 having at least one geographic zone 718 whose tenancy may be residential, as in an apartment, semi-attached, detached dwelling, and the like, or industrial/commercial, as in an office, plant, mall, factory, warehouse, and the like, and which defines a demand D for hydrogen. Such user 716 may transmit its demand by (i) use of a credit card, (ii) use of a smart card, or (iii) use of an electronic, electric, or wireless data transmission, to register a hydrogen demand D within zone 718 to a zone controller 720 exemplifying zone data control and supply means.

Upon receipt of the demand, zone controller 720 determines the nature of the demand D with respect to the quantity of hydrogen requested, the time to deliver the hydrogen, the conditions under which to deliver the hydrogen with respect to temperature, pressure, purity and the like, the end utilization purpose of the hydrogen, and the rate of delivery of the hydrogen requested. Such initial definition of this hydrogen demand D may be performed by a single or a plurality of zone controller(s) 720 interconnected in a network configured as a "hub", "star", "ring" or "backbone" as exemplified in FIGS. 1A-1C, in such a way as to permit intercommunication between all controllers 720 to a unit controller 721 for the unit 717 exemplifying a building data and control supply means via bus 722.

Upon receipt of the demand D by unit controller 721 from the network of zone controllers 720, unit controller 721 determines the availability A of all energy resources 12 available to building unit 717 by polling the status from a network controller 14 to which it is interconnected with respect to the amount of energy available, the nature of the power available, the time availability of the energy, the type of energy source available, the unit price per increment of energy and compares this to the energy required to generate the energy, the type of energy source available, the unit price per increment of energy and compares this to the energy required to generate the hydrogen demanded by unit 717 and subsequent zones 718. Energy

supplied by energy source 12 is generated from one or more types of primary energy resources P that may include renewable energy resources R. The types of primary energy resources P include fossil fuels, wind, solar, nuclear and hydro resources.

Upon receipt of the demand, network controller 14 further determines the status S of all hydrogen producing sources 10 on the network. Initial checks include the current status of the hydrogen source, percentage use of rated capacity, rated capacity to produce hydrogen of a known quantity for a know amount of energy consumption and monitoring of the process parameters for starting the hydrogen production source(s), process valves and electrical switch status network controller 14 then initiates the starting sequence for hydrogen producing source(s) 10 to meet the demands of unit 717 and subsequent zones 718 subject to the availability of energy resource(s) 12 at the lowest possible cost.

Network controller 14 secures a quantity of energy from energy source(s) 12 at the most preferred cost to unit 717 and updates unit controller 721 and zone controller 720 to permit hydrogen to flow through conduits 724. Energy is then consumed from energy source 12 to produce hydrogen via hydrogen production source(s) 10 for the generation of hydrogen and oxygen gases which are supplied to the unit 717 through zones 718.

Hydrogen flowing in conduit 724 to unit 717 is monitored by unit controller 721 which further controls the distribution of hydrogen within unit 717. Hydrogen may flow so as to enter storage unit 726 for storage as compressed gas, liquid H2, hydrides, etc for later use by a zone 718, and may flow along conduit 728 to a direct conversion device 730 for conversion of hydrogen into electricity via a fuel cell, internal combustion engine and the like (not shown) for a further central distribution within unit 717. It may further be converted into heat and/or electricity by an indirect conversion device 732, such as a boiler, furnace, steam generator, turbine and the like for further central distribution within unit 717 and may be further passed along conduit 728 directly to a zone 718. Hydrogen conversion devices 730 or 732 may be connected to an electricity grid 2 such as a local area grid for residences, apartment complexes, commercial and industrial buildings or sites, or a wide area grid such as a national, state of provincial grid.